



AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (Withdrawn) An energy irradiation apparatus comprising an insertion portion which includes a hollow cylindrical member having a sealed distal end portion and is inserted into a living body, and an energy irradiation mechanism which is placed inside the hollow cylindrical member and radiates energy to living tissue through an irradiation window portion which is provided on a side wall of the hollow cylindrical member to extend in a longitudinal direction, wherein

said energy irradiation mechanism comprises

an energy irradiation end portion which is placed facing the irradiation window portion and reciprocating along the longitudinal direction of the irradiation window portion, and

a driving unit which drives said energy irradiation end portion to make reciprocating motion with substantially a constant velocity.

2. (Withdrawn) The apparatus according to claim 1, wherein
said energy irradiation end portion comprises a mirror placed facing a light exit surface of an optical fiber for energy transmission, and
a guide comprises an angle changing mechanism which changes a light exit angle of said mirror with respect to an opening portion upon the reciprocal movement

to make said mirror reflect energy output from the light exit of the optical fiber and direct the energy to a deep portion of living tissue.

3. (Withdrawn) The apparatus according to claim 2, wherein power of reciprocating motion with substantially a constant velocity by said driving unit is transmitted through the optical fiber.

4. (Withdrawn) The apparatus according to claim 3, wherein said insertion portion incorporating said energy irradiation mechanism and said guide and said driving unit are configured to be separated from each other, and said insertion portion is configured to be detachable from said driving unit by engaging a locked member fixed to a midway portion of the optical fiber with a lock portion of a power transmission member of said driving unit.

5. (Withdrawn) The apparatus according to claim 1, wherein said driving unit comprises a motor which rotates at a constant velocity, and a power transmission portion which sets a ratio of a time for direction change of the reciprocating motion with substantially a constant velocity to a time for one reciprocating motion to not more than 35%.

6. (Withdrawn) The apparatus according to claim 1, wherein a ratio of an interval of motion with a constant velocity to a stroke of reciprocating motion is more than 70%.

7. (Withdrawn) The apparatus according to claim 5, wherein the power transmission portion comprises a heart cam mechanism portion.

8. (Withdrawn) The apparatus according to claim 5, wherein the power transmission portion comprises a crank mechanism portion including a plurality of elliptic gears which are rotatably and axially supported.

9. (Withdrawn) The apparatus according to claim 5, wherein the power transmission portion comprises an intermittent gear which has a sector gear formed on an outer surface and is rotatably and pivotally supported, and an endless belt which includes a teeth portion which meshes with the sector gear of said intermittent gear and is formed on an inner surface of the endless belt and is linearly guided.

10. (Withdrawn) The apparatus according to claim 5, wherein the power transmission portion comprises a first conversion portion which converts the uniform rotating motion from said motor into uniform swinging motion, and a second conversion portion which converts the converted uniform swinging motion into uniform linear motion.

11. (Withdrawn) The apparatus according to claim 10, wherein said first conversion portion includes a roller gear cam mechanical portion, and said second conversion portion includes a flexible member which is wound around a pulley fixed to a shaft member which rotatably and axially supports a disk having a roller which meshes with a gear of said roller gear cam mechanical portion and is linearly guided.

12. (Withdrawn) The apparatus according to claim 1, wherein the energy includes a laser beam.

13. (Withdrawn) The apparatus according to claim 1, wherein said motor comprises a linear motor.

14. (Withdrawn) The apparatus according to claim 1, wherein said energy irradiation end portion comprises an ultrasonic radiator.

15. (Currently Amended) An energy irradiation apparatus comprising an insertion portion which includes a hollow cylindrical member having a sealed distal end portion and is configured to be inserted into a living body, and an energy irradiation mechanism which is placed inside the hollow cylindrical member and radiates energy to living tissue through an irradiation window portion which is provided on a side wall of the hollow cylindrical member to extend in a longitudinal direction, wherein

said energy irradiation mechanism comprises

an energy irradiation end portion which is placed facing the irradiation window portion and reciprocating along the longitudinal direction of the irradiation window portion,

a transmitting member which transmits a reciprocation in a major axis direction of said insertion portion to cause said energy irradiation end portion to make reciprocating motion,

a cylinder which is held to be rotatable about an axis parallel to an axis in the longitudinal direction and has a shaped portion which is formed on an outer surface and reciprocates said transmitting member, and
a driving unit including a motor which rotates said cylinder.

16. (Original) The apparatus according to claim 15, wherein the shaped portion of said cylinder reciprocates said transmitting member at substantially a constant velocity, and sets a ratio of a time for direction change to a time for one reciprocating motion to not more than 35%.

17. (Previously Presented) The apparatus according to claim 15, wherein a ratio of an interval of motion with a constant velocity to a stroke of reciprocating motion is more than 70%.

18. (Original) The apparatus according to claim 15, wherein said cylinder comprises a hat-like member which is directly coupled to an output shaft of said motor and can incorporate said motor.

19. (Original) The apparatus according to claim 15, wherein the shaped portion comprises an endless groove which is continuously formed on the outer surface of said cylinder, and causes said transmitting member to make the reciprocation by causing said transmitting member to follow said endless groove.

20. (Original) The apparatus according to claim 19, wherein said endless groove causes said transmitting member to make one reciprocation or two reciprocations per rotation of said cylinder.

21. (Original) The apparatus according to claim 15, wherein said energy irradiation end portion comprises a mirror placed facing a light exit of an optical fiber for energy transmission, and a guide comprises an angle changing mechanism which changes a light exit angle of said mirror with respect to the irradiation window portion upon the reciprocal movement to make the mirror reflect energy output from the light exit of the optical fiber and direct the energy to a deep portion of living tissue.

22. (Original) The apparatus according to claim 21, wherein said transmitting member is fiber.

23. (Original) The apparatus according to claim 19, wherein said insertion portion incorporating said energy irradiation mechanism and said guide and said driving unit are configured to be separated from each other, and said insertion portion is configured to be detachable from said driving unit by engaging a locked member fixed to the transmitting member with the endless groove of said cylinder.

24. (Original) The apparatus according to claim 15, wherein the energy comprises a laser beam.

25. (Original) The apparatus according to claim 15, wherein said energy irradiation end portion comprises an ultrasonic radiator.

26. (New) An energy irradiation apparatus comprising:
an insertion portion which includes a hollow cylindrical member having a sealed distal end portion and is configured to be inserted into a living body, and an energy irradiation mechanism which is placed inside the hollow cylindrical member and radiates energy to living tissue through an irradiation window portion which is provided on a side wall of the hollow cylindrical member to extend in a longitudinal direction,

wherein said energy irradiation mechanism comprises an energy irradiation end portion which is placed facing the irradiation window portion and reciprocating along the longitudinal direction of the irradiation window portion, and driving a unit which drive said energy irradiation end portion to make reciprocating motion with substantially a constant velocity, and sets a ratio of a time for direction change to a time for one reciprocating motion to not more than 35%.

27. (New) The apparatus according to claim 26, wherein a ratio of an interval of motion with a constant velocity to a stroke of reciprocating motion is more than 70%.